



**US Army Corps
of Engineers**
Engineer Research and
Development Center

News Release

Release No. A07-03

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For Release: Immediate

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Patent Uses Novel Procedure for Merging Two or More DEMs

A classic problem with mapping in the photogrammetric community is merging geospatial or geographic information, which was acquired through the use of differing collection and production systems. This has been an issue from the days during which the map was produced from actual surveying on the ground and continues today when the map is a result of acquiring and manipulating digital imagery. Mr. James Damron of the U.S. Army Engineer Research and Development Center's (ERDC), Topographic Engineering Center, Alexandria, Va., recently applied for a patent on a novel procedure for merging two or more Digital Elevation Models (DEMs), which are the basic building blocks of modern mapping systems.

The invention applied for titled, "Fusion of Data from Differing Mathematical Models," automatically resolves vertical offsets commonly found when merging DEMs from different collection and production systems, such as technologies used in single pass Interferometric Synthetic Aperture Radar (IFSAR), Light Detection and Ranging (LIDAR), photogrammetry, and DEMs derived from contour-based elevation data and Global Positioning System point data.

The invention is used to automatically merge two or more multi-resolution DEMs that have differing horizontal and vertical datums with various ellipsoid and geoid models associated with the DEM data. These multiple DEMs are merged two at a time into a single common model.

Possible applications include updating older DEM data sets of local, county, and state governments, and U.S federal agencies, as well as those of foreign governments. Further, Geographic Information System (GIS) users are able to access improved hydrologic and hydraulic analysis for flood-plain mapping where DEM data are required.

Known advantages of the invention include:

- provide an ability to update existing models by automatically merging newer data having a differing format;

- reduce the need for additional collection because the formats of existing data are not compatible;
- provide automatic provisions for quality control of data;
- reduce the overall cost of mapping; and
- increase efficiency in employing or reusing previously collected data.

Mr. Damron holds an Associate of Science degree in Cartographic and Mapping Techniques and a Bachelor's of Science degree in Geography from Western Kentucky University. He has completed master's-related course work from Murray State University and George Mason University. He has 12 years of experience in GIS and mapping activities in the federal government and university relating to local and county government. Mr. Damron is a veteran of the U.S. Army and has worked as a Geographer for ERDC-TEC for 9 years.

The ERDC is the premier research and development facility for the Corps of Engineers. It consists of seven laboratories at four geographic sites, with more than 2,000 employees, \$1.2 billion in facilities, and an annual research program exceeding \$570 million. It conducts research in both military and civil works mission areas for the Department of Defense and the nation. Its primary mission areas include military engineering, battlespace environment, facilities and infrastructure, environmental quality and water resources.